CLAIMS

1. An electromagnetic field analyzer comprising:

dividing means (22) for dividing form data as an analysis object into coarse elements and fine elements;

forming means (25) for forming a matrix making an electromagnetic field vector of the coarse elements divided by the dividing means (25) related to an electromagnetic field vector of the fine elements, and

calculating means (28 and 29) for calculating an approximate solution of the electromagnetic field vector of the fine elements by applying an iteration method of simultaneous linear equations while referring to the matrix formed by the forming means (25).

2. An electromagnetic field analyzer as claimed in claim 1, wherein the forming means (25) forms the matrix by expressing the elements of electromagnetic field vectors at the sides at a fine element using an interpolation function in the coarse elements.

3. An electromagnetic field analyzer as claimed in claim 2, wherein, when the length of a side l_i of the fine element is $|l_i|$, an interpolation function showing the relation between the electromagnetic field at position x of the side l_i of the fine element and the electromagnetic field at a side j of the coarse element is N_j^c (x), and the tangential vector of the side l_i of the fine element is t_i, the forming

means (25) forms a matrix P_{ij} by using the following expression.

Expression 1

$$P_{ij} = \frac{1}{|l_i|}\int_{l_i} N_j^C(x)\cdot t_i dl \qquad \cdots(14)$$

4. An electromagnetic field analyzer as claimed in any one of claims 1 to 3, wherein, in the calculation means (28 and 29), the accuracy of an approximate solution of the electromagnetic field vector of the fine elements is improved such that high-frequency components included in the approximate solution of the electromagnetic field vector of the fine element are removed by applying a stationary iteration method of simultaneous linear equations, that a residual in the fine elements is mapped to a residual in the coarse elements by using the matrix formed by the forming means (25), that a correction vector to the coarse elements is formed by applying a direct method or a non-stationary iteration method of simultaneous linear equations, and that a correction vector to the fine elements is obtained by using the matrix formed by the forming means (25).

5. A computer program to cause a computer to execute an electromagnetic field analyzing method for analyzing an electromagnetic field as an analysis object,

wherein the computer contains a first storage means

(23) for storing divided elements and a second storage means (27) for storing a matrix, and

wherein the electromagnetic field analyzing method contains the steps of dividing form data as an analysis object into coarse elements and fine elements and storing the elements in the first storage means (23), forming a matrix making an electromagnetic field vector of the coarse elements stored in the first storage means (23) related to an electromagnetic field vector of the fine elements and storing the matrix in the second storage means (27), and calculating an approximate solution of the electromagnetic field vector of the fine elements by applying an iteration method of simultaneous linear equations while referring to the matrix stored in the second storage means (27).

6. A storage medium, being computer readable, for recording a program to cause a computer to execute an electromagnetic field analyzing method for analyzing an electromagnetic field as an analyzing object,

wherein the computer contains a first storage means (23) for storing divided elements and a second storage means (27) for storing a matrix, and

wherein the electromagnetic field analyzing method contains the steps of dividing form data as an analysis object into coarse elements and fine elements and storing the elements in the first storage means (23), forming a

matrix making an electromagnetic field vector of the coarse elements stored in the first storage means (23) related to an electromagnetic field vector of the fine elements and storing the matrix in the second storage means (27), and calculating an approximate solution of the electromagnetic field vector of the fine elements by applying an iteration method of simultaneous linear equations while referring to the matrix stored in the second storage means (27).